Volume 1 1960-1961

STATE OF ALASKA

William A. Egan, Governor

Alaska Department of Fish and Game

C. L. Anderson, Commissioner

Sport Fish Division

E. S. Marvich, Director

ANNUAL REPORT OF PROGRESS, 1960-1961

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-2

SPORT FISH INVESTIGATIONS OF ALASKA

Alex H. McRea, Coordinator, Juneau
Robert T. Baade, Fishery Biologist, Ketchikan
Gary L. Finger, Fishery Biologist, Juneau
Jean R. Dunn, Fishery Biologist, Seward
Edward J. Cramer, Fishery Biologist, Anchorage
Rupert E. Andrews, Fishery Biologist, Palmer
George L. Van Wyhe, Fishery Biologist, Glennallen
Roger J. Reed, Fishery Biologist, Fairbanks

Introduction

This report of progress consists of the Job Completion Reports from the State of Alaska's Federal Aid in Fish Restoration Project F-5-R-2, "Sport Fish Investigations of Alaska".

The current Project is composed of eighteen separate studies and were designed to evaluate the various aspects of the State's recreational fisheries resources. The information gathered will provide the necessary background data for the development of future programs. During the current segment continued emphasis was placed on overall inventorying of accessible waters and the evaluation of general catch data.

Several problems of immediate concern appeared sufficiently defined to warrant independent studies. As a result, two independent creel censuses, one experimental silver salmon egg take and a Resurrection Bay area silver salmon population study were instigated. Data accumulated from prior jobs dealing with the Arctic grayling has resulted in the formulation of three separate investigations during the current segment.

The rapid expansion of Alaska's population is being reflected in the ever increasing numbers of "No Trespassing" signs encountered in the vicinity of population centers. Fortunately, much of Alaska's fishing waters are still in the public domain. An aggressive program of acquiring access to fishing waters, instigated in 1959, was continued during the present segment. Increased emphasis is being placed on this job and the successful continuation of this activity, now and in the immediate future, will forestall many of the serious recreational use problems currently facing other states.

The enclosed progress reports are fragmentary in many respects and the interpretations contained therein are subject to re-evaluation as the work progresses.

Volume 2 Report No. 4

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1960 - 1961 SEGMENT

State: ALASKA

Project No: F-5-R-2 Name: Sport Fish Investigations of Alaska

Job No: 4 Title: Investigation of the Sport Fish Harvest of Southeastern Alaska King Salmon

Period Covered: July 1, 1960 to April 15, 1961

Abstract:

A sampling program was formulated by the Alaska Department of Fish and Game in 1959 to determine the sport harvest of king salmon (Oncorhynchus tshawytscha) in Southeastern Alaska. An additional phase of the program was to investigate the racial characteristics or stocks of king salmon of Southeastern Alaska origin.

During the regular 1960 fishing season a total of 2,029 king salmon were sampled for a number of fishery and biological variables. In addition, 1,015 kings were sampled in the various special salmon derbies during 1959 and 1960.

The king salmon downstream migration in a typical Southeastern Alaska king river was also studied by means of a floating, inclined-plane trap during the spring and summer of 1960 and the spring of 1961. The timing, age of migration and a sample of king salmon smolts for morphometric comparisons were obtained.

Aerial surveys of king salmon spawning areas were conducted in conjunction with a comprehensive review of the literature and catch records to determine the available king spawning areas in Southeastern Alaska. The proposed detailed coverage of these spawning units was outlined for the 1961 field season.

Objectives:

The program was formulated (July 1, 1959) with two major objectives to be investigated: (1) To ascertain the magnitude of the sport harvest of king salmon in Southeastern Alaska and (2) To initiate a racial study for the purpose of separating stocks of king salmon as to place of origin.

Introduction:

The king salmon stocks in Alaska, similar to other coastwise areas, have been in a state of heavy decline since 1935 when 17 million pounds were landed in the Alaska troll fishery. In 1960 the Alaska troll catch was only 4.8 million pounds and was one of the lowest on record.

Because of the long range migratory behavior of the king salmon, usually northward with stocks of fish from Washington, Oregon, and British Columbia entering into the fishery, the problem has been one of coastwise concern.

The states of California, Oregon, Washington and the province of British Columbia have for several years recorded the sport catch of kings to augment the commercial fisheries statistics. In 1959 the Alaska Department of Fish and Game instigated a program to evaluate the sport harvest of Southeastern Alaska caught king salmon to complete the overall coastal enumeration of this species. In addition to the sport catch evaluation, the program was designed to provide information on the different racial stocks of Southeastern Alaska king salmon.

Procedure:

Part I - Magnitude of Sport Harvest

A sampling program was formulated to check the sport catch of king salmon for the following fishery dependent variables: number caught, area caught, number of fishermen, size and the type of boat, hours fished, type of fishing tackle and bait, tide and weather conditions and where landed.

Information on the following biological factors was also obtained: size of fish (length and weight), scale samples for age determination, sex, and flesh color (red or white kings).

The sampling was conducted in the two main fishing areas in Southeastern Alaska, Ketchikan and Juneau. The fishermen were contacted at the boat landings and on the fishing grounds. Two men were stationed in each town to conduct the fisherman interviews and record the above information.

As a supplement to the regular season's coverage of the sport fishery, the major salmon derbies were also sampled. The same information obtained above was collected from these derbies, but due to the special fisheries aspect of the data obtained from these sources, it was treated separately.

Part II - Southeastern Alaska Racial Stocks

The number of king salmon that Southeastern Alaska contributes to the total king salmon population in Southeastern Alaska waters was investigated by a program of spawning ground coverage and river mouth gill net catch analysis. Aerial surveys of the king salmon rivers were conducted as a prelude to the actual ground coverage of these spawning grounds.

A downstream smolt-trapping operation was conducted on the Taku River (near Juneau) to provide information on the timing of the king smolt run. Specimens were obtained and preserved for future length, weight, and age determinations. The trapping was accomplished by means of a floating, reversed inclined plane type trap and from beach seining operations.

Findings:

Seasonal Catch Success

1. A total of 2,029 king salmon were sampled during the 1960 season (excluding Derby fish) from 2,310 boat trips in the Juneau and Ketchikan areas (Table 1). This

number resulted in an overall seasonal catch per boat trip (C.P.U.E.) of 0.88 for king salmon. This figure included the catch of the sport-commercial fisherman (defined below) as well as the strictly sport fisherman.

Sport-commercial fishermen are defined as those fishermen who use pleasure type boats, sport tackle and sport fishing methods, but who possess a commercial fishing license and sell their fish. The possession of a commercial license allows the fishermen to use up to four fishing rods (usual number was one or two rods) while the sport fisherman was restricted to the use of only one fishing pole. The sport-commercial fisherman was also exempt from the limit regulations on king salmon while the sport fisherman was limited in catch of these species. However, the liberal, daily limit of fifty pounds and one fish or three king salmon, which ever is less restrictive, did not usually result in any great advantage to the average sport-commercial fisherman insofar as numbers of king salmon caught. There were no limit restrictions on the other species of salmon.

Some difficulty in the sampling procedure was experienced in the separation of the sport and sport-commercial fishermen.

2. The seasonal C.P.U.E. for coho salmon (Oncorhynchus kisutch) was 0.75 fish based on a sample of 1,738 fish. The coho salmon was the only other species of Pacific salmon that was important in the sport fishery.

3. The C.P.U.E. for total salmon (combined species) was 1.71 fish from a 3,951 fish sample.

4. The Juneau district had approximately four times greater effort and catch as the Ketchikan district although the C.P.U.E. for the two areas were of comparable magnitude.

5. A comparison of the sport and sport-commercial fishermen (successful fishermen only) showed that the sport-commercial fishermen caught more fish with over two times as great a C.P.U.E. (Table 2).

As the sport-commercial fishermen were recorded only if they sold their fish, only the successful sport fishermen (those who caught fish) were used for comparison.

Many reasons are responsible for this superiority of the sport-commercial fishermen. They fished longer hours, could use more than one rod, and were generally the more experienced fishermen.

Table 1. The numbers of fish, boats and catch per boat for the combined sport and sport-commercial catch in 1960.

AREA	SPECIES	NO. FISH	NO. BOATS	C.P.U.E.*
Ketchikan	Total	759	470	1.62
	King	392		0.83
	Coho	296		0.63
	Pink	70		0.15
	Chum	1		0.00
Juneau	Total	3192	1840	1.73
	King	1637		0.89
	Coho	1442		0.78
	Pink	97		0.05
	Chum	16		0.01
Total	Total**	3951	2310	1.71
	King	2029		0.88
	Coho	1738		0.75
	Pink	167		0.07
	Chum	17		0.01

*catch per boat
**2,783 sport-commercial and 1,168 sport

Table 2. The 1960 seasonal sport and sport-commercial C.P.U.E. (fish per boat trip) for successful fishermen.

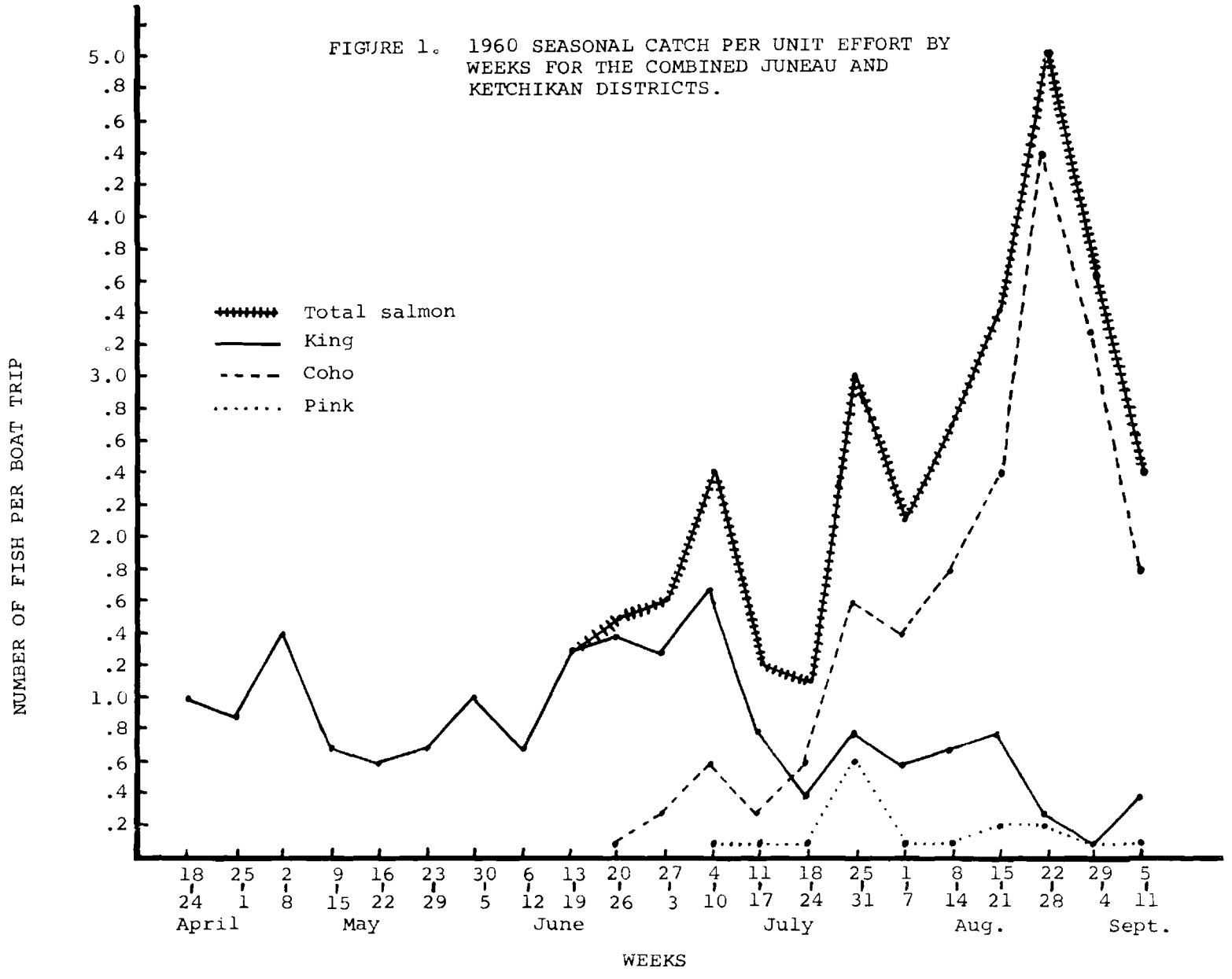
		SPORT			
AREA	Total Salmon	King	Coho	Pink	Chum
Ketchikan	1.73	1.00	0.52	0.21	----
Juneau	1.59	1.17	0.36	0.05	0.01
Total	1.63	1.12	0.41	0.09	0.01
	"SPORT-COMMERCIAL"				
Ketchikan	4.13	1.91	1.93	0.29	0.01
Juneau	4.80	2.10	2.54	0.14	0.02
Total	4.69	2.07	2.44	0.17	0.02

Timing of the Various Species into the Fishery

1. The king salmon were the only species landed in the fishery from its start in late April to the last part of June when the coho entered the catch. These species were followed in early July by the pink (Oncorhynchus gorbuscha) and chum salmon (Oncorhynchus keta). No red salmon (Oncorhynchus nerka) were recorded in the catch. (Figure 1).

2. The angler success for king salmon as measured by the catch per boat trip displayed a late April-early May peak followed by a gradual decline and then a rise until the greatest success was reached in late June-early July. The catch drops rapidly after the first week in July and reaches its lowest level by the end of August.

FIGURE 1. 1960 SEASONAL CATCH PER UNIT EFFORT BY WEEKS FOR THE COMBINED JUNEAU AND KETCHIKAN DISTRICTS.



3. The coho salmon showed a sharp build-up from the time of their entry into the fishery in late June with the peak success occurring in late August.

4. The pink salmon, along with the occasional chum only entered the catch incidentally to the king and coho fishery. The pink showed a peak success in late July.

5. The coho and king salmon in the Juneau and Ketchikan districts which represent the northern and southern regions of Southeastern Alaska respectfully, showed the same general availability curves. Both species had their greatest success a little earlier in the Ketchikan district. (Figure 2).

Success by Boat Type, Gear and Method of Fishing

1. The inboard boat with a closed cabin though numerically much less in use displayed a larger degree of success than outboards. (Figure 3). This is probably due to their greater size and range which enabled them to stay out longer and fish the more remote areas where the fishing pressure was lighter.

2. The cabin or closed boat also showed a superiority over the open boat in C.P.U.E.

3. The fresh herring was superior to the frozen herring as bait in both the Ketchikan and Juneau districts. (Figure 4). The three methods of using herring for bait were ranked as to success in the following manner: (1) strip, where a fillet or side strip is used (2) plug cut (head removed by a bevel cut), and (3) whole herring. Whole fresh herring was by far the most popular bait in usage.

4. Flashers, spoons, and plugs, though not widely used, were also successful lures.

5. The method of fishing as to degree of success for all species of salmon was ranked as follows: (Figure 5). (1) Drift-spinning (drifting boat while the bait is given action by tide, hand, or reel action), (2) Mooching (slow trolling and drifting combined), (3) Anchored-spinning, and (4) Trolling (steady motor use usually of constant speed to provide bait action).

FIGURE 2. 1960 SEASONAL CATCH PER UNIT EFFORT BY WEEKS FOR THE JUNEAU AND KETCHIKAN DISTRICTS.

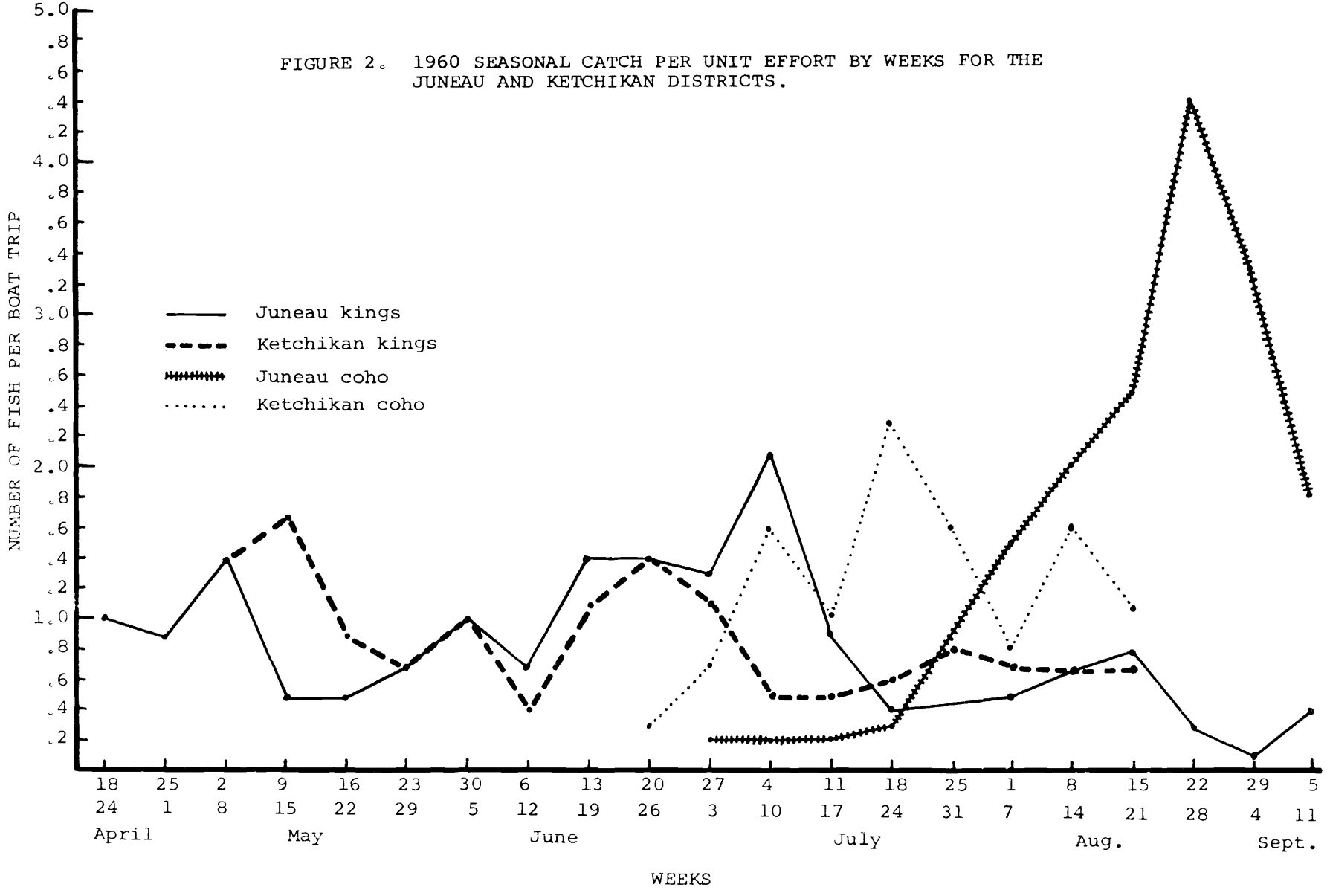


FIGURE 3. 1960 CATCH PER UNIT EFFORT BY BOAT TYPE.

Sample size in ( ).

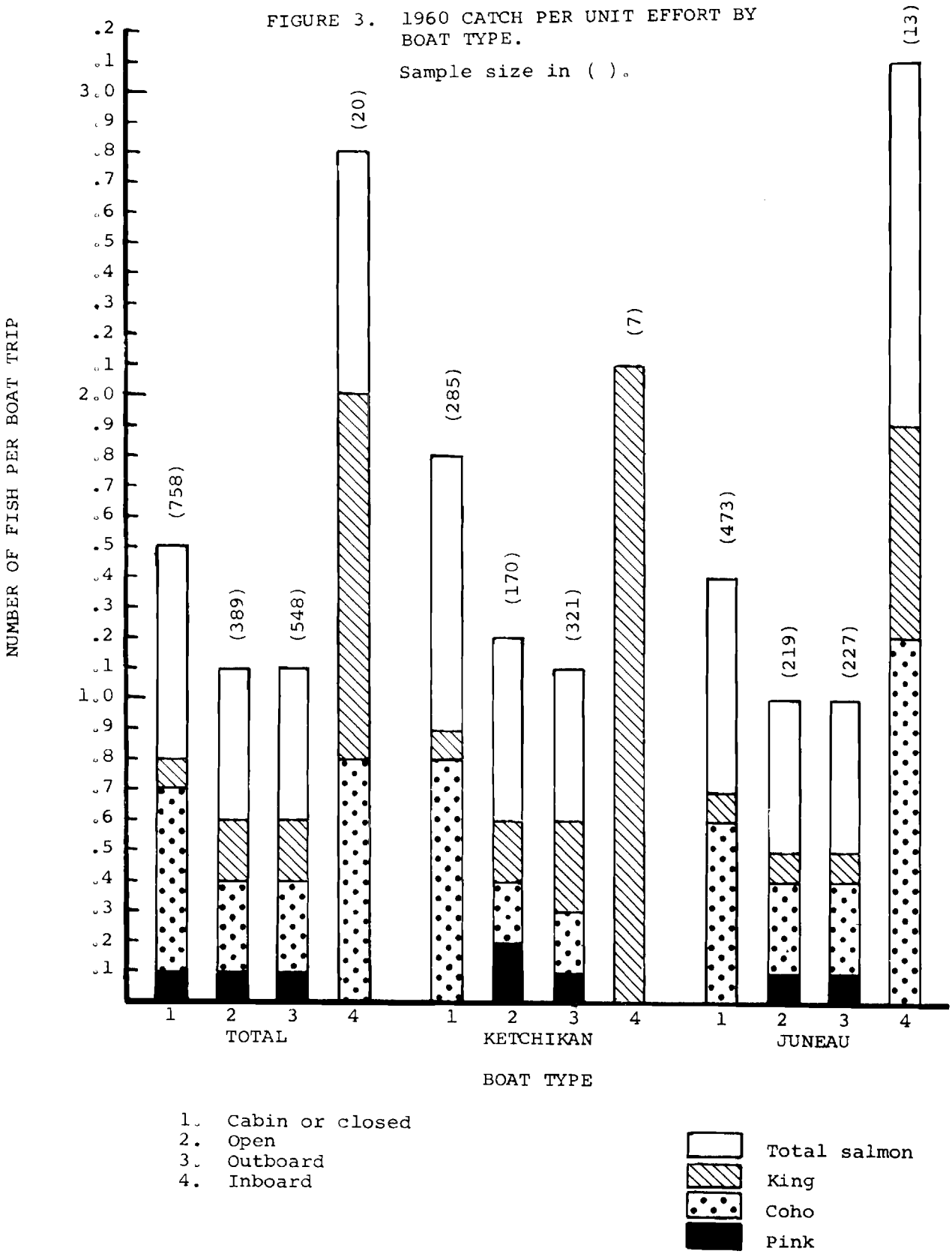


FIGURE 4. 1960 CATCH PER UNIT EFFORT BY GEAR TYPE (6 or more boats). Sample size in ( ).

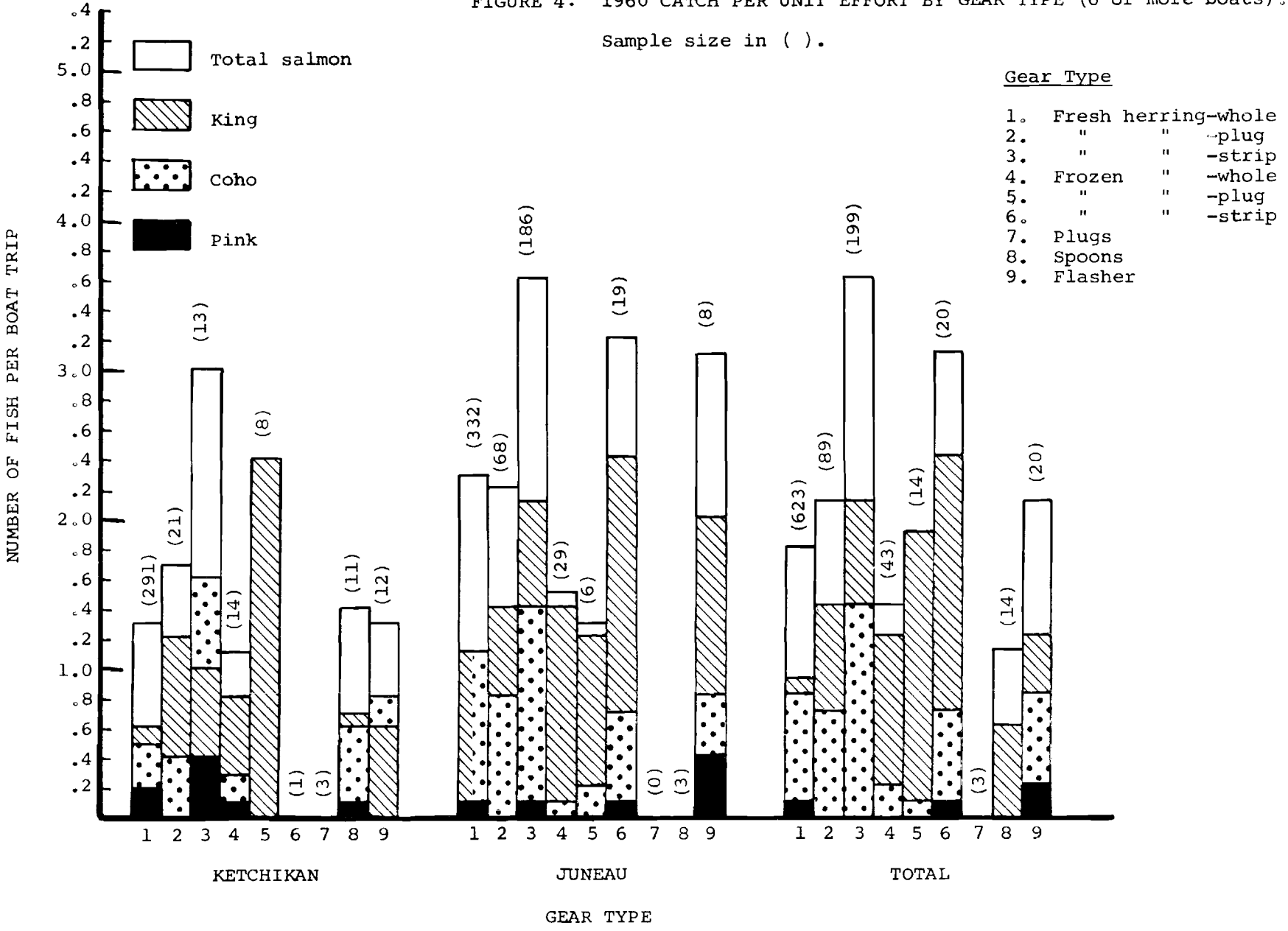
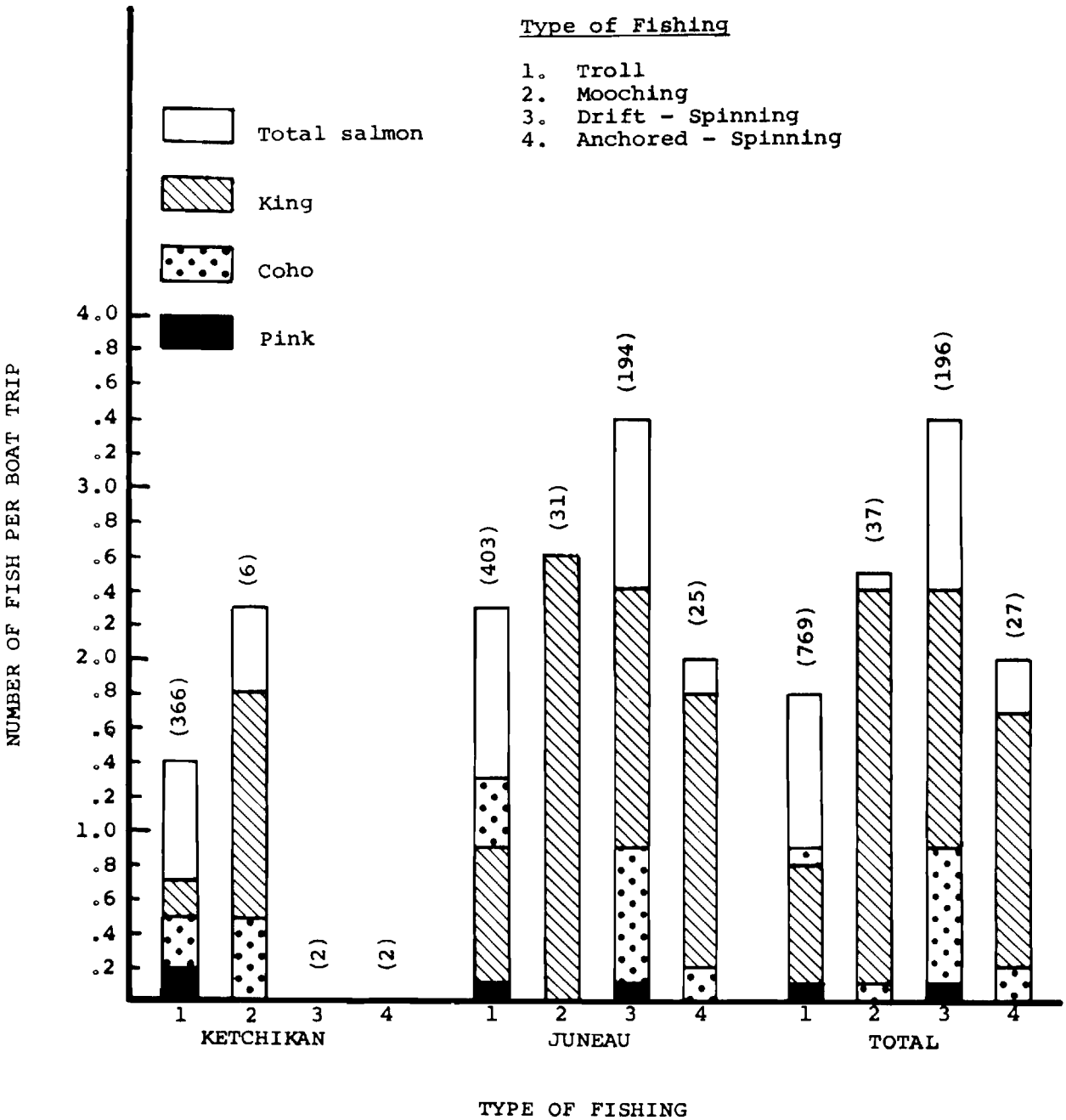


FIGURE 5. 1960 SEASONAL CATCH PER UNIT EFFORT BY METHOD OF FISHING. (6 or more boats)

Sample size in ( ).



6. For king salmon alone the best methods were mooching and drift-spinning.

7. Trolling was as successful or better a method for catching coho salmon as any of the other methods.

Success by Weather and Tide Conditions

1. The greatest fishing success occurred on cloudy days with the lowest success on windy and rainy days. (Figure 6).

2. There was no clear-cut superiority of tide conditions in fishing success. (Figure 7).

Success by Local Area

1. In the Ketchikan area the fishing intensity was concentrated in two major areas, the Mountain Point and Clover Pass areas. Both of these areas are at the ends of the road leading north and south out of Ketchikan and have small boat harbors. (Figure 8).

2. The C.P.U.E. for both of the above areas in Ketchikan was lower than the areas further away from town, which were not utilized to any great degree.

3. The fishing areas in the Juneau district are spread over a greater distance and the fishermen go further in order to fish.

4. The greatest success for king and coho salmon fishing in Juneau occurred in different areas. West Douglas Island and Eagle River produced the highest catch per boat for kings while the North and South Shelter Island area registered the highest C.P.U.E. for coho salmon.

5. The greatest fishing effort unlike the Ketchikan effort was not associated with the lowest C.P.U.E. in the Juneau area. Some of the more intensively fished areas in Juneau produced the better fishing.

Fish Size

1. The average size of the king salmon decreased steadily throughout the fishing season. (Figures 9 and 10).

FIGURE 6. 1960 CATCH PER UNIT EFFORT BY WEATHER CONDITION.
Sample Size in ( ).

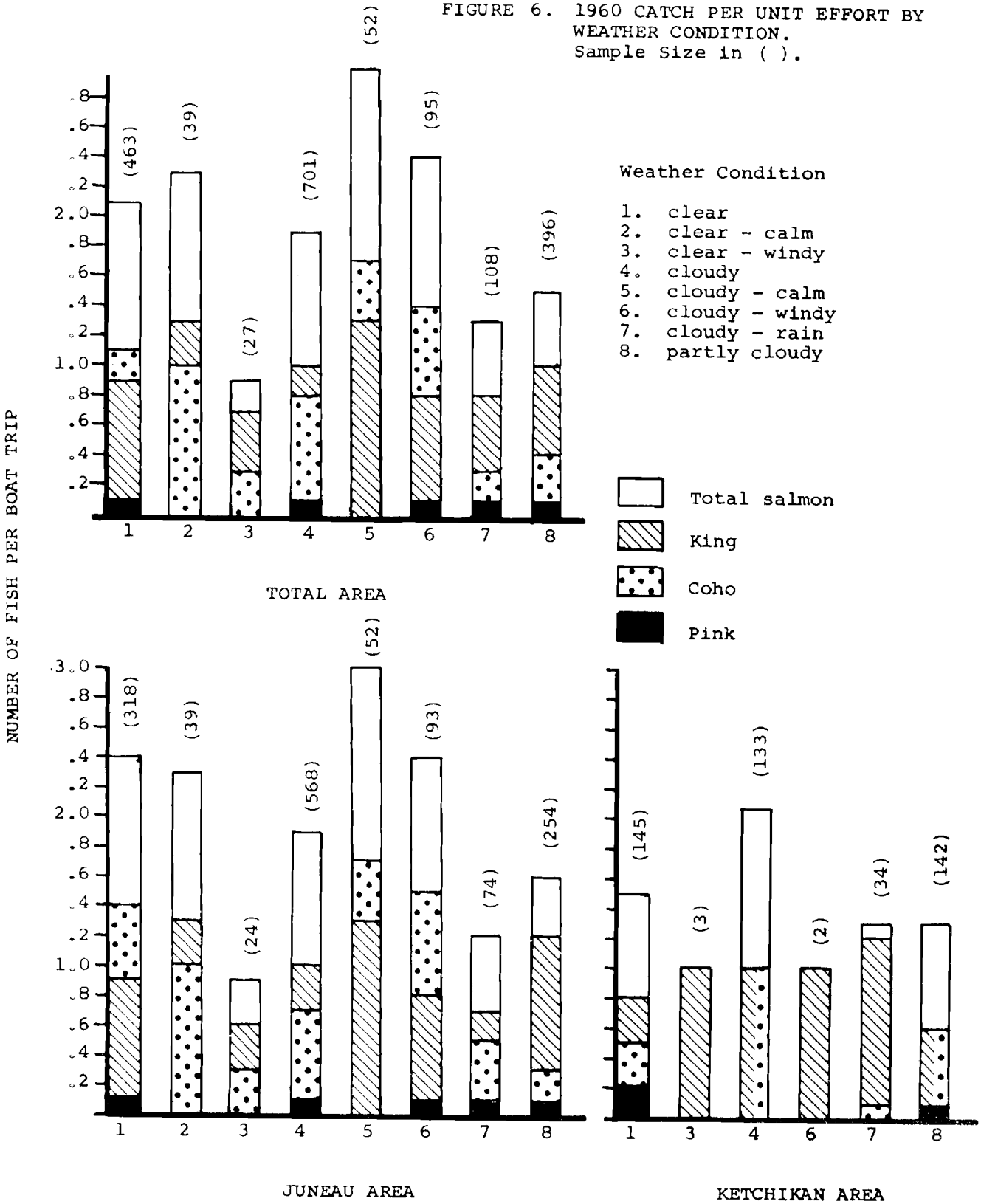


FIGURE 7. 1960 SEASONAL CATCH BY TIDE CONDITION.

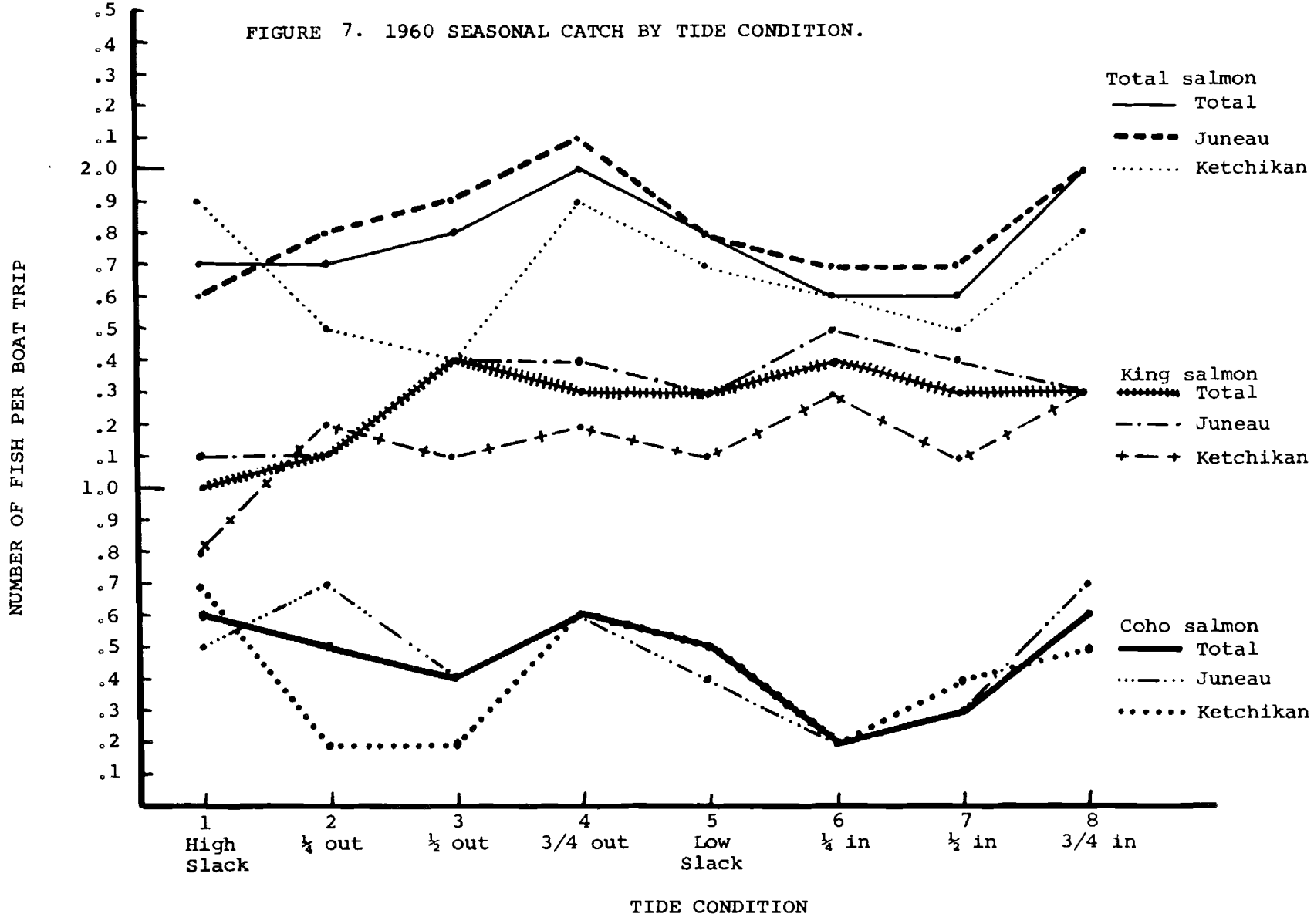


FIGURE 8. 1960 SEASONAL CATCH PER UNIT EFFORT BY LOCAL AREAS.

(Five or more boats).

Sample size in ( ).

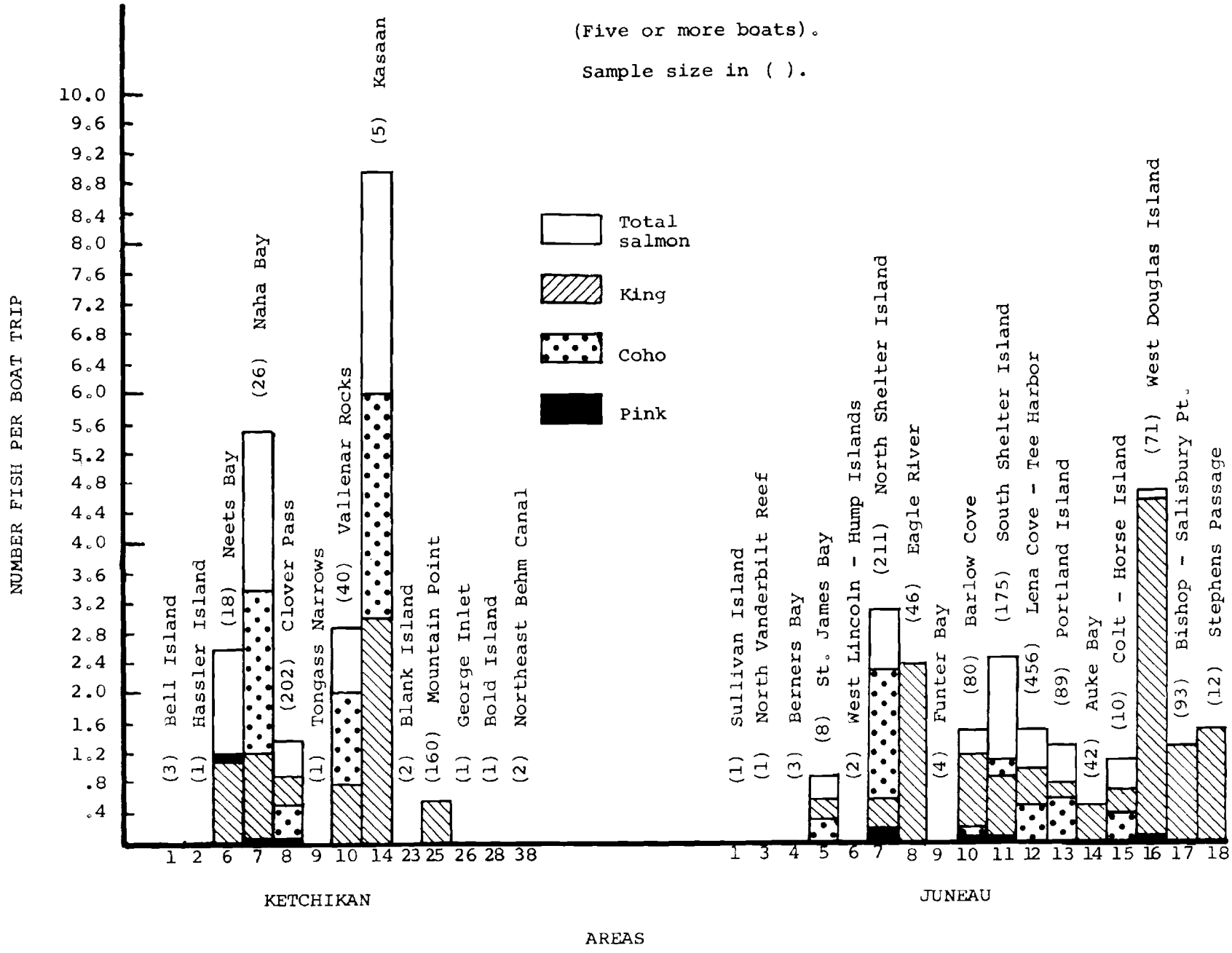


FIGURE 9. 1960 SEASONAL AVERAGE WEIGHT OF KING SALMON IN JUNEAU AND KETCHIKAN.

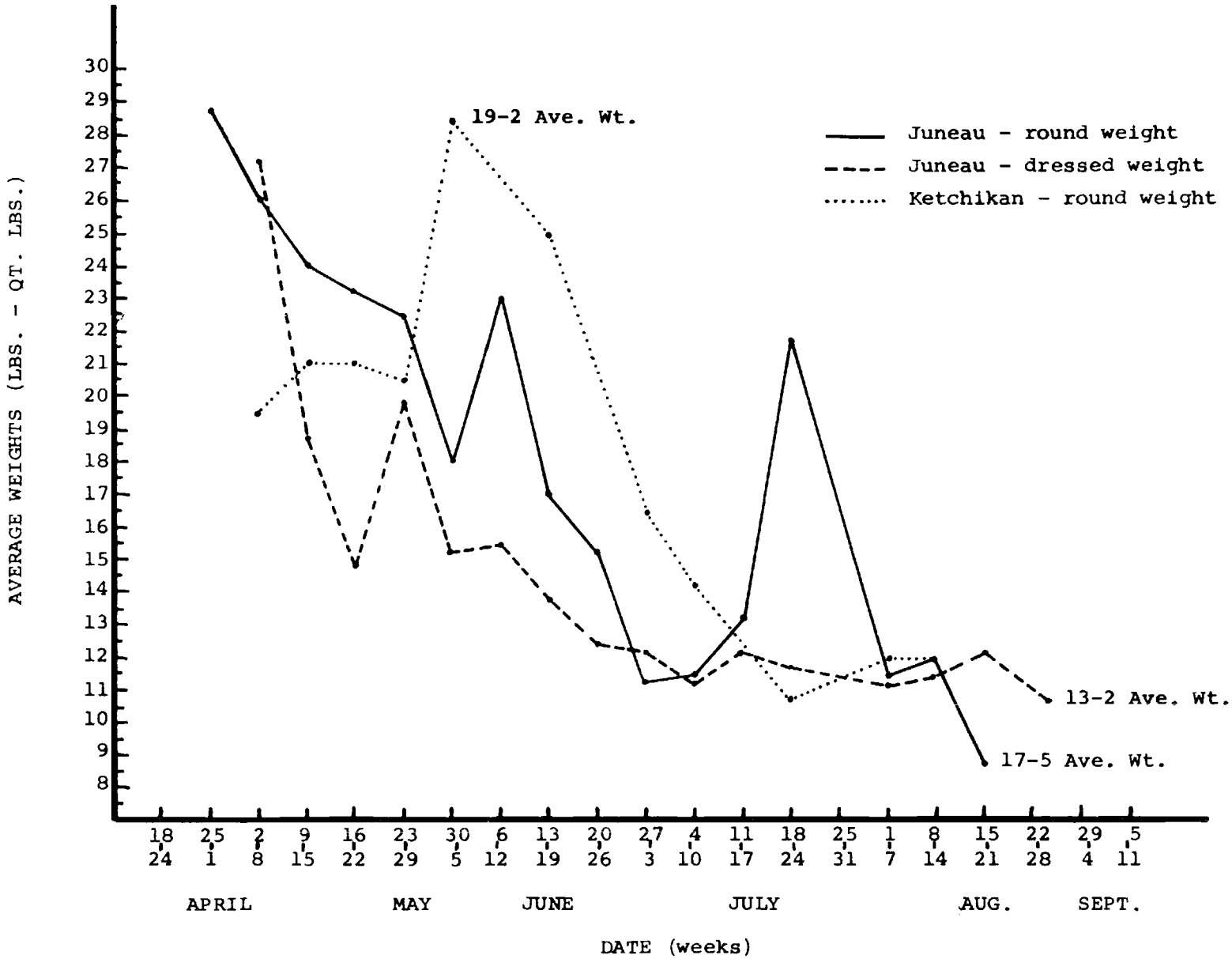
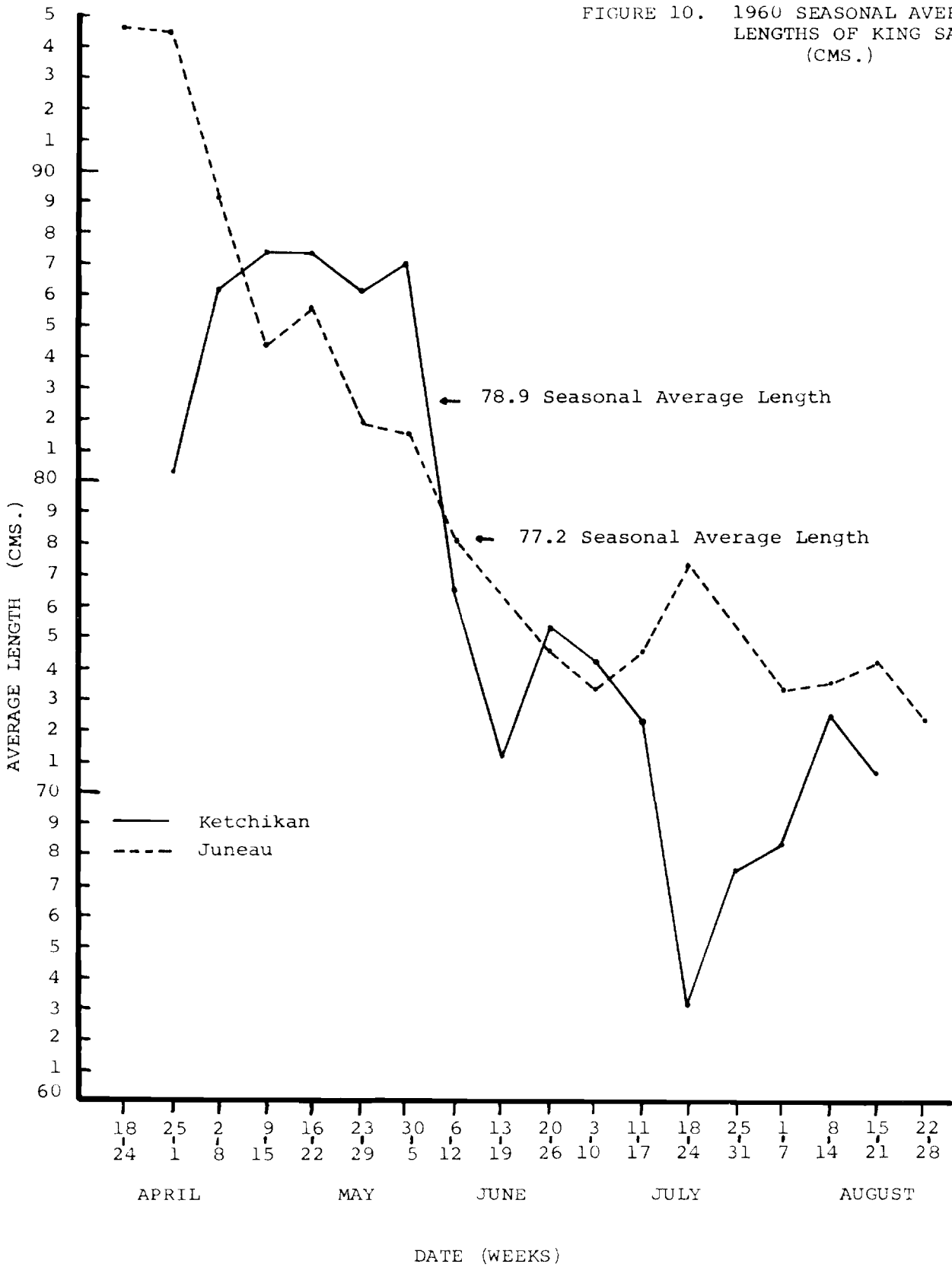


FIGURE 10. 1960 SEASONAL AVERAGE LENGTHS OF KING SALMON. (CMS.)



The fishery harvested the mature spring-run spawners in late April-early June and after these fish had passed through the fishery and the catch was largely dependent on feeding stocks of immature king salmon.

2. There was little difference between the seasonal average size of the Ketchikan and Juneau stocks of kings. The Ketchikan fish averaged 18 lbs. 12 ozs. with an average length of 78.9 cms. The Juneau fish had a 17 lb.-8 oz. weight and a 77.2 cm. average. The averages for the combined areas were 17 lbs. 15 ozs. and 77.5 cms. (Table 3).

3. The average dressed weight (heads on) of the Juneau caught king salmon was 12 lbs. 13 ozs. This represented an average viscera weight of 4 lbs. 11 ozs. per fish.

4. The Juneau coho salmon were larger than the Ketchikan coho. The Juneau fish averaged 9 lbs. 0 ozs. and 67.6 cms. while the Ketchikan coho had an average weight of 7 lbs. 3 ozs. and a length of 64.7 cms. The seasonal average for both areas was 8 lbs. 11 ozs. and 67.5 cms.

5. There was very little difference between the weights and lengths of the Juneau male and female king salmon. The Juneau males averaged 21 lbs. 0 ozs. and 79.7 cms. while the females averaged 20 lbs. 9 ozs. and 82.3 cms. (Tables 4 and 5).

6. The Ketchikan female kings were smaller than the males. The males averaged 20 lbs. 2 Ozs. and 83.2 cms. while the females averaged 17 lbs. 5 ozs. and 80.6 cms.

7. The female coho salmon were smaller than the males in both the Ketchikan and Juneau areas. They were a little over a pound smaller in average weight.

Sex Ratio

1. The Ketchikan kings showed a slight majority of female fish with 47.3% of the fish males and 52.7% females. (Table 6).

2. The females were more dominant in the Juneau catch with 41.7% males and 58.3% females.

Table 3. The Seasonal Average Lengths and Weights of King and Coho Salmon.

	LENGTH (cms.)			
	KING		COHO	
Area	Number of Fish	Average Length	Number of Fish	Average Length
Ketchikan	334	78.9	49	64.7
Juneau	1423	77.2	1129	67.6
Total	1757*	77.5	1178**	67.5

*86.6% of kings sampled
**66.8% of coho sampled

	WEIGHT (lbs. - ozs.)				
		KING		COHO	
Area	Fish Condition	Number of Fish	Average Weight	Number of Fish	Average Weight
Ketchikan	Round*	245	18-12	57	7- 3
	Dressed**	3	---	---	---
Juneau	Round	481	17- 8	170	9- 0
	Dressed	1029	12-13	998	7-15
Total	Round	726	17-15	227	8-11
	Dressed	1032	12-13	998	7-15
GRAND TOTAL		1758+		1225++	

*Round Weight- entire fish weighed
**Dressed Weight - heads on; viscera removed
+86.7% of kings sampled
++70.5% of coho sampled

Table 4. The 1960 Average Weights of Male and Female King and Coho Salmon in the Juneau and Ketchikan Areas.

	KING				
		Male		Female	
Area	Weight	Number of Fish	Average Weight	Number of Fish	Average Weight
Ketchikan	R*	104	20- 2	107	17- 5
	D**	0	----	1	----
Juneau	R	87	21- 0	129	20- 9
	D	144	13-11	198	15-11
Total	R	231	20- 9	236	19- 1
	D	---	----	---	----
TOTAL		335		435	
GRAND TOTAL		770+			

*R = Round weight
**D = Dressed weight
+26.4% of the kings sampled for both weight and sex

	COHO			
	Male		Female	
Area	Number of Fish	Average Weight	Number of Fish	Average Weight
Ketchikan	14	8- 7	15	7-4
	0	0	0	---
Juneau	42	9-14	35	8-6
	373	8-12	226	7-5
Total	56	9- 8	50	8-1
	---	----	---	----
TOTAL	429		276	
GRAND TOTAL	705*			

*40.6% of the coho sampled for both weight and sex

Table 5. The 1960 Average Length of Male and Female King and Coho Salmon in the Ketchikan and Juneau Areas.

	KING*			
	Male		Female	
Area	Number of Fish	Average Length	Number of Fish	Average Length
Ketchikan	106	83.16	122	80.57
Juneau	222	79.74	312	82.32
Total	328	80.85	434	81.83

*37.6% of the kings sampled for both sex and length

	COHO**			
	Male		Female	
Area	Number of Fish	Average Length	Number of Fish	Average Length
Ketchikan	15	65.33	14	64.50
Juneau	412	69.25	253	66.53
Total	427	69.11	267	66.42

**39.9% of the coho sampled for both sex and length

Table 6. The 1960 King and Coho Salmon Sex Composition for the Juneau and Ketchikan Areas.

	KING*				
	Male		Female		
Area	Number of Fish	Per Cent	Number of Fish	Per Cent	Sex Ratio
Ketchikan	113	47.3	126	52.7	IM:1.1F
Juneau	235	41.7	328	58.3	IM:1.4F
Total	348	43.4	454	56.6	IM:1.3F

*39.5% of the king salmon sampled for sex

	COHO**				
	Male		Female		
Area	Number of Fish	Per Cent	Number of Fish	Per Cent	Sex Ratio
Ketchikan	15	45.5	18	54.6	IM:1.2F
Juneau	416	61.4	262	38.6	IF:1.6M
Total	431	60.6	280	39.4	IF:1.5M

**40.9% of the coho sampled for sex

3. The overall sex ratio for the two areas was 43.4% males and 56.6% females. This predominance of females resulted in a sex ratio of 1.3 females for each male salmon. This condition of more females in the catch was in agreement with the results of the salmon derby data (see below) where 1.4 females in Ketchikan and 1.5 females in Juneau were caught for each male king landed. It was not determined whether female kings were more susceptible to sport fishing techniques or if they were only in greater abundance in the fishery.

4. The Juneau caught male coho salmon were more abundant than the females. Sixty-one and four tenths per cent were males and 38.6% were females. The sample size for Ketchikan coho was too small (29 fish) to draw any valid conclusions, although the females were dominant in the sample.

Flesh Color - King Salmon

1. The more economically important red-fleshed kings were dominant in the catch in both the Juneau and Ketchikan areas. Eighty-four and one tenth per cent of the fish were red and 15.9% were white-fleshed in the Ketchikan area. Sixty-seven and six tenths per cent reds and 32.4% whites were obtained in Juneau. (Table 7). The combined Juneau and Ketchikan areas resulted in a catch of 71.5% red-fleshed and 28.5% white-fleshed kings.

2. The above percentage values for red and white kings held true when analysed by sex. Only the Juneau females showed a somewhat lower red to white ratio, with a 10% lower value in the red-fleshed fish.

Salmon Derby Results

In 1960 the Juneau derby was covered as in 1959, and in addition the Ketchikan derby was studied for the first time under this program. Numbers, weights, lengths, sex, and other information was obtained on the king salmon from these derbies. Additional information was obtained from the Sitka and Craig-Klawock derby records. Results are as follows:

Table 7. The Numbers and Sex Composition of Red and White Fleshed King Salmon.

	MALE				
Area	Number of Red	Number of White	Total Fish	Per Cent Reds	Per Cent Whites
Ketchikan	23	7	30	76.67	23.33
Juneau	87	32	119	73.11	26.89
Total*	110	39	149	73.83	26.17

*A total of 1,331 king salmon were sampled for flesh color from sport, sport-commercial, and commercial catches. Of the 2,029 kings sampled in the sport and sport-commercial fishery a total of 960 or 47.31% were sampled for flesh color.

	FEMALE				
Area	Number of Red	Number of White	Total Fish	Per Cent Reds	Per Cent Whites
Ketchikan	50	15	65	76.92	23.08
Juneau	120	67	187	64.17	35.83
Total	170	82	252	67.46	32.54

	COMBINED SEXES				
Area	Number of Red	Number of White	Total Fish	Per Cent Reds	Per Cent Whites
Ketchikan	269	51	320	84.06	15.94
Juneau	683	328	1011	67.56	32.44
TOTAL**	952	379	1331	71.53	28.47

**930 additional fish were not sexed but flesh color was obtained.

A. Biological Factors

1. A total of 1,015 king salmon were sampled from a total of 1,161 kings landed in four official stations in the three derbies in Juneau and Ketchikan. Table 8 lists the number of kings sampled by place of landing.

2. Juneau fish averaged 75.7 cms. in length in 1959 and 73.1 cms. in 1960. The two year average was 74.4 cms. (Table 9).

3. Ketchikan kings averaged 84.7 cms. in length. (Table 10).

4. The average king salmon weight was 14 lbs.- 11 ozs. in Juneau and 20 lbs.- 6 ozs. in Ketchikan.

   The larger fish from the Ketchikan area resulted from a difference in the degree of maturity of the stock. Only a few of the fish landed in Juneau were adult spawners whereas the Ketchikan fish were largely mature (Table 10). Juneau fish were caught after the spring spawning migration had passed through the fishing area while the Ketchikan derby was held during the time of this migration. The Juneau fishery was conducted on feeding populations of king salmon while the Ketchikan fishery exploited a mixture of spawning and feeding fish.

5. One and a half female kings for each male were caught in both years in Juneau and 1.4 female for each male was landed in Ketchikan. The reason for the predominance of females over males in the catch was not apparent. Whether the female population was greater than the male at the time of the fishery or whether the females took the lure more readily was not determined.

6. The color of the flesh (white or red king) was investigated in the Ketchikan area and found to be equal to 3.8 red kings for each white king landed. The red flesh color has been economically more desirable than the white flesh and this high ratio in favor of the reds, therefore , has economic significance.

Table 8. Total Number of King Salmon Landed and Total Number Sampled During Juneau and Ketchikan Salmon Derbies.

	Juneau - 1959			Juneau - 1960		
	Tee Harbor	Auke Bay	Total	Tee Harbor	Auke Bay	Total
No. Kings Landed	261	338	599	146	215	361
Length Sample	255	209	464	146	212	358
Weight Sample	205	169	374	145	213	358
Sex Sample	246	---	246	137	82	219
Total Kings Sampled	256	211	467	146	215	361
Total Coho			862*	250	400	650
Other Species of Salmon				4	15	19
Total Fish			1461**	400	730	1030

*Derived by subtraction of total kings from total fish. Includes a few other species of salmon.

**Based on number of fish turned in for prizes plus the number turned in for door-prize drawing.

	Ketchikan - 1960			
	Clover Pass	Mt. Point	Total	TOTAL
No. Kings Landed	113	88	201	1161
Length Sample	99	88	187	1009
Weight Sample	91	88	179	911
Sex Sample	89	84	173	638
Total Kings Sampled	99	88	187	1015
Total Coho	6	--	6	1518
Other Species of Salmon				19
Total Fish	119	88	207	2698

Table 9. King Salmon Length, Weight and Sex Ratio for the 1959 and 1960 Juneau Salmon Derbies.

	TEE HARBOR			AUKE BAY		
Date	Average Length (cms)	Average Weight (lbs-ozs)	No. female per ea. male	Average Length	Average Weight	Sex Ratio
July 24-59	77.3	16- 1	1.5	75.0	14-11	---
July 29-60	77.5	15- 9	4.4	76.7	15-12	---
July 25-59	77.1	16- 0	1.2	75.1	15- 9	---
July 30-60	75.8	14-12	1.1	70.8	12- 6	5.0
July 26-59	74.4	16-15	1.7	75.4	16- 2	---
July 31-60	73.2	13- 7	1.3	70.6	13- 3	1.5
Total 1959	76.1	16- 4	1.5	75.2	15-9	----
Total 1960	75.1	14- 7	1.4	71.7	13- 4	1.6
Total 1959-1960	75.6	15- 6	1.5	73.5	14- 7	1.6

	TOTALS		
Date	Length	Weight	Sex Ratio
July 24-59	76.2	15- 6	1.5
July 29-60	77.1	15-11	4.4
July 25-59	76.1	15-12	1.2
July 30-60	72.8	13- 5	1.2
July 26-59	74.9	16- 8	1.7
July 31-60	71.7	13- 5	1.3
Total 1959	75.7	15- 9	1.5
Total 1960	73.1	13-12	1.5
Total 1959-1960	74.4	14-11	1.5

Table 10. King Salmon Biological Statistics for the 1960 Ketchikan Special Derby Days.

AREA	DATE	Aver. Length (cms)	Aver. Weight (lbs-ozs)	Sex Ratio (Male=M) (Female=F)	No. of Red Flesh each White	Maturity Ratio (Mature=M) (Immature=IM)
CLOVER PASS	June 4	86.1	20-14	1.1 M: 1F	4.0	1.1 IM: 1M
	June 5	84.5	20-15	3.2 F: 1M	4.2	1.3 M: 1 IM
	June 11	92.0	33- 4	1.4 M: 1F	3.0	2.0 M: 1 IM
	June 12	86.2	22-15	2.3 F: 1M	5.3	1.9 M: 1 IM
	Total 4 - 5	85.4	20-14	1.6 F: 1M	4.1	1.1 M: 1 IM
	Total 11-12	88.1	23-10	1.5 F: 1M	4.3	1.9 M: 1 IM
	Total	86.4	21-15	1.5 F: 1M	4.2	1.3 M: 1 IM
MOUNTAIN POINT	June 4	80.5	17- 9	1.1 M: 1F	3.6	1.2 M: 1 IM
	June 5	82.7	18- 4	1.7 F: 1M	2.7	1.2 IM: 1 M
	June 11	86.7	21-11	1.1 F: 1M	4.7	1.3 M: 1 IM
	June 12	82.7	18-10	1.3 F: 1M	3.0	1.7 M: 1 IM
	Total 4 - 5	81.5	17-14	1.2 F: 1M	3.1	1.1 IM: 1 M
	Total 11-12	84.9	20- 4	1.2 F: 1M	3.7	1.4 M: 1 IM
	Total	82.9	18-13	1.2 F: 1M	3.3	1.2 M: 1 IM
	TOTAL	84.7	20- 6	1.4 F: 1M	3.8	1.3 M: 1 IM

B. Fishery Factors

1. Approximately 1,438 boats in 1959 and 1,197 boats in 1960 were used by 3,511 and 3,479 fishermen respectively in the Juneau derbies. (Table 11).

2. The smaller Ketchikan derby had 1,442 fishermen and 657 boats. (Table 12).

3. This resulted in an overall catch per unit of effort (C.P.U.E.) of 0.10 for fishermen and 0.30 for boats in the Juneau derby in 1960 and a C.P.U.E. of 0.17 for fishermen and 0.42 for boats in 1959. (Tables 13 and 15).

4. The Ketchikan derby resulted in a C.P.U.E. of 0.14 for fishermen and 0.31 for boats. (Table 12). This was quite good for derby fishing in general; but the Ketchican value was not up to the levels enjoyed in previous years.

5. A sample of the unsuccessful fishermen in the Ketchikan derby showed that they spent an average of 5.76 hours a day in their unsuccessful fishing effort while the successful fishermen also spent 5.76 hours a day in their successful effort. The successful fishermen spent on an average of 4.08 hours from the start of fishing to the landing of their fish. (Table 14).

6. The numbers of fishermen and boats and C.P.U.E. for all the derbies covered (Table 15) showed that all the derbies enjoyed about the same level of success except that the Craig-Klawock derby showed a higher level of fish harvest. The 1960 level in this derby, however, was less than the level attained in 1958. The general opinion of the fishermen in Craig-Klawock as well as in Ketchikan was that king salmon fishing was considerably below the level of success of previous years.

7. Limited information on the seasonal Craig-Klawock derby (Table 16) for the past few years showed

Table 11. Number of Boats and Fishermen in the 1959 and 1960 Juneau Salmon Derbies.*

TEE HARBOR

Date	Open Skiff I	Small Cabin II	Large Cabin III	Yacht Troller IV	Total
7/24/59	67	105	8	4	184
7/25/59	90	128	10	3	231
7/26/59	95	126	10	4	235
Totals	252	359	28	11	650
7/29/60	45	91	12	7	155
7/30/60	56	116	20	5	197
7/31/60	50	74	10	6	140
Total	151	281	42	18	492

*Numbers were derived by calculation, direct count and in some cases were corrected by estimation.

AUKE BAY

Date	Open Skiff	Small Cabin	Large Cabin	Yacht Troller	Total	Total Boats
7/24/59	225		29		254	438
7/25/59	231		30		261	492
7/26/59	241		32		273	508
Totals	697		91		788	1438
7/29/60	59	110	13	18	200	355
7/30/60	79	121	28	15	243	440
7/31/60	74	135	37	16	262	402
Total	212	336	78	49	705	1197

Table 11. (Continued) Number of Boats and Fishermen in the 1959 and 1960 Juneau Salmon Derbies.

	AVERAGE NUMBER OF FISHERMEN PER BOAT				
DATE	AREA	I	II	III	IV
1960	Tee Harbor	2.5	2.8	4.4	----
	Auke Bay	2.5	2.6	---	----
	Average	2.5	2.7	4.4	4.4**
1959	Tee Harbor	----		----	
	Auke Bay	2.7		4.4	
	Average	2.7		4.4	

**Estimated as being the same as class III and as the 1959 value.

	COMPUTED NUMBER OF FISHERMEN					
	AREA	I	II	III	IV	TOTAL
1960	Tee Harbor	378	759	185	79	1401
	Auke Bay	531	989	343	215	2078
	Total	909	1748	528	294	3479
1959	Tee Harbor					1347
	Auke Bay					2164
	Total					3511

Table 12. Numbers of Boats, Fishermen, and C.P.U.E. for the 1960 Ketchikan Special Derby Days.

CLOVER PASS										
	JUNE 4		JUNE 5		JUNE 11		JUNE 12		TOTAL	
Boat Class	Boats	Fishermen	Boats	Fishermen	Boats	Fishermen	Boats	Fishermen	Boats	Fishermen
Open Skiff I	42	88	44	95	38	71	31	60	155	314
Small Cabin II	29	68	45	100	50	108	45	97	169	373
Large Cabin III	20	55	8	20	8	19	13	32	49	126
Yacht-Troller IV	3	7	1	3	1	4	0	0	5	14
Total	94	218	98	218	97	202	89	189	378	827
C.P.U.E.	0.47	0.20	0.29	0.13	0.13	0.06	0.32	0.15	0.30	0.14
Ave. Fisherman/Boat	2.32		2.20		2.08		2.12		2.19	
MOUNTAIN POINT										
I	27	54	33	63	20	38	29	66	109	221
II	26	52	31	64	26	56	33	83	116	255
III	15	36	14	32	13	33	10	31	52	132
IV	0	0	1	4	1	3	0	0	2	7
Total	68	142	79	163	60	130	72	180	279	615
C.P.U.E.	0.43	0.20	0.30	0.15	0.32	0.15	0.22	0.09	0.32	0.14
Ave. Fisherman/Boat	2.09		2.06		2.17		2.50		2.20	
TOTALS										
I	69	142	77	158	58	109	60	126	264	535
II	55	120	76	164	76	164	78	180	285	628
III	35	91	22	52	21	52	23	63	101	258
IV	3	7	2	7	2	7	0	0	7	21
Total	162	360	177	381	157	332	161	369	657	1442
C.P.U.E.	0.45	0.20	0.29	0.14	0.20	0.10	0.27	0.12	0.31	0.14
Ave. Fisherman/Boat	2.22		2.15		2.11		2.23		2.20	

Table 13. Catch Per Unit of Effort* of King and Coho Salmon Landed in the 1960 Juneau Salmon Derby.

C.P.U.E.* per Fisherman

	TEE HARBOR			AUKE BAY			TOTAL		
Date	King	Coho	Total	King	Coho	Total	King	Coho	Total
June 29	0.03	0.13	0.19	0.06	0.26	0.32	0.06	0.20	0.26
June 30	0.11	0.21	0.32	0.13	0.17	0.30	0.13	0.18	0.31
June 31	0.14	0.20	0.33	0.11	0.17	0.28	0.12	0.18	0.30
Total	0.10	0.18	0.28	0.10	0.19	0.30	0.10	0.19	0.29
C.P.U.E. per Boat									
June 29	0.18	0.36	0.54	0.18	0.75	0.93	0.18	0.58	0.76
June 30	0.33	0.59	0.91	0.40	0.49	0.89	0.36	0.53	0.90
June 31	0.39	0.56	0.94	0.32	0.50	0.82	0.34	0.52	0.86
Total	0.30	0.51	0.81	0.31	0.57	0.87	0.30	0.54	0.85

*Number of fish landed/number of fishermen and boats.

Table 14. Number of Hours Fished by Successful and Unsuccessful Fishermen in the Mountain Point Area of the 1960 Ketchikan Derby.

Unsuccessful Fishermen

Date	No. of Boats Sampled	No. of Fisher-men	Average Fishermen Per Boat	Number of Fish	C.P.U.E.*	Total Hours Fished**	Average Fishermen Hours Fished
June 4	35	73	2.1	0	0	224.25	6.41
June 5	35	72	2.1	0	0	173.00	4.94
June 11	21	48	2.3	0	0	118.50	5.64
June 12	30	61	2.0	0	0	180.75	6.03
Total 4 - 5	70	145	2.1	0	0	397.25	5.68
Total 11-12	51	109	2.1	0	0	299.25	5.87
Total	121	254	2.1	0	0	696.50	5.76

Successful Fishermen

Date	No. of Boats Sampled	No. of Fisher-men	Average Fishermen Per Boat	Number of Fish	C.P.U.E.*	Total Hours Fished**	Total Hrs. to Catch Fish+	Total Average Hours Fished	Ave. Hrs. to Catch Fish+
June 4	24	50	2.1	26	0.52	146.95	117.25	5.65	4.51
June 5	19	40	2.1	23	0.58	121.50	87.75	5.28	3.82
June 11	19	39	2.1	19	0.49	116.50	73.25	6.13	3.86
June 12	16	32	2.0	16	0.50	98.75	64.20	6.17	4.01
Total 4 - 5	43	90	2.1	49	0.54	268.45	205.00	5.48	4.18
Total 11-12	35	71	2.0	35	0.49	215.25	137.45	6.15	3.93
Total	78	161	2.1	84	0.52	483.70	342.45	5.76	4.08

*Catch per unit effort (No. fish/No. fishermen).

**Includes boat running time.

+Number of hours after start of fishing to time fish caught.

Table 15. Success of Southeastern Alaska Salmon Derbies for King Salmon. (Seasonal Derbies not included). Including Years that Data is Available.*

Locations and Date	Number of Boats	Number of Fishermen	Ave. No. of Fishermen	Number of Kings	Ave. Wt. of fish (lbs-ozs)	C.P.U.E. (Boats+)	C.P.U.E. (Fishermen)
Juneau - 1959 July 24,25,26	1438	3511	2.44	599	15- 9	0.42	0.17
Juneau - 1960 July 29,30,31	1197	3479	2.91	361	13-12	0.30	0.10
Ketchikan - 1960 June 4, 5, 11,12	657	1452	2.21	201	20- 6	0.31	0.14
Sitka** - 1960 June 18,19,25,26	218	550	2.52	70	27- 0	0.32	0.13
Craig-Klawock** 1958 - 2 days	20	50	2.52	44	29- 0	2.20	0.88
Craig-Klawock** 1960 - 2 days	12	30	2.52	14	29- 0	1.17	0.47
Total	3542	9072	2.56	1289	22- 7	0.36	0.14

*Numbers of boats and fishermen derived by direct count and corrected by estimation in some cases.

**Number of boats in Sitka and Craig-Klawock derbies derived by using average persons/boat in the Juneau and Ketchikan derbies. Numbers of fisherman and fish from derby records. No direct sampling of the derbies.

+Catch per unit effort.

Table 16. Craig-Klawock Seasonal Salmon Derby.*

YEAR	Number of Fish	No. of Tickets Sold	No. of people entering fish	Average Weight of Fish (lbs-ozs)	C.P.U.E. of Total Fishermen	C.P.U.E. of Successful Fishermen
1956	76	52	30	----	1.46	2.53
1957	63	72	29	----	0.88	2.17
1958	277	78	43	28-15	3.55	6.44
1959	143	59	31	28- 5	2.42	4.61
1960	129	68	30	31- 9	1.89	4.30
Total	688	329	163	29-10	2.09	4.22

*Fish entered for weekly prize. Not all fish caught were entered. Fishing success only for derby size fish.

that there has been a decrease in fishing success, as measured by the C.P.U.E., since 1958. The data for 1956 and 1957 was not too reliable and should not be directly compared to the later data, as the derby committee provided additional inducement for fishermen to turn in their smaller fish in later years.

Taku River King Smolt Study

During the 1960 field season, a pilot study was undertaken to evaluate a typical Southeastern Alaska king salmon smolt migration. Information on the timing and age of the downstream migrants as well as the collection of specimens for possible racial morphometric measurements were the goals of the study.

A large modified inclined plane or scoop trap was specially built and used as the collection apparatus in the turbid, glacial Taku River near Juneau. This river is characteristic of the king salmon rivers in Southeastern Alaska. The trap was fished steadily from May 17 to October 23, except for a period of time when it was inoperative because of log damage from May 23 to June 7.

The general timing of the king and other salmon species was determined only in a general way because of the late spring start and trap failure during the heighth of the downstream migration, but the general period of migration time, similar to other downstream migrations in other river systems, was shown to occur largely during the spring months.

A total of approximately 4,500 smolts were captured in the trap during the field season. The majority of these were king and coho salmon, with lesser numbers of reds, pinks and chums. Lengths, weights and scale and fish samples were taken periodically throughout the season. Additional samples were collected by means of beach seining for comparative purposes.

One of the major problems encountered was the difficulty of distinguishing the difference between king and coho smolts. An external characteristic was found (pigmentation of the adipose fin) which when checked by pyloric caeca counts proved to be a valid distinguishing character. (Alaska Department of Fish and Game, Information Leaflet No. 1)

From the 1960 field season's operational experience, a 1961 spring sampling program was designed to determine more accurately the timing of the Taku River king salmon smolts. The trap operation was designed to be fished periodically at constant intervals 24 hours a day and at a constant depth. Each fishing period was one hour-50 minutes in duration with ten minutes allowed for cleaning the trap and to collect the captured fish. A random sample of the total catch was to be measured and weighed with scales taken for age and growth analysis. Water temperatures, levels, and turbidities in addition to other physical measurements were recorded.

Recommendations:

One of the chief difficulties in sampling the sport catch was the problem of ascertaining the percentage of sampling coverage. A study to determine the degree of sampling coverage by means of questionnaires and/or aerial counts is planned for the 1961 field season in addition to the established program. The 1961 field season will also provide a replicate of the 1960 field season's results. It is, therefore, recommended that the king salmon sport fish sampling program be continued.

The preliminary aerial surveys and literature coverage on the known king salmon streams in Southeastern Alaska were conducted during the 1960 field season. A program has been formulated to cover the chief king salmon spawning areas by boat and by ground parties during the 1961 field season. Information on the contribution of these spawning areas to the overall king salmon stocks in Alaskan waters will be investigated and, therefore, it is also recommended that this phase of the program be continued.

Prepared by:

Gary Finger
Research Biologist
30 June 1961

Approved by:

Alex H. McRea
D-J Coordinator

Dr. Howard D. Tait, Director
Biological Research Division

E. S. Marvich, Chief
Sport Fish Division